The ultimatum game, a meta-analysis of 30 years of experimental research

Jean-Christian Tisserand

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Abstract

In this article, we focus on the choices of the proposers of the ultimatum game and the explanatory variables that may influence the amount offered. For that purpose, we perform a meta-analysis on a total of 97 observations of simple ultimatum games gathered through 42 articles published between 1983 and 2012. While the theoretical prediction announces that offers in the ultimatum game should be zero, our results show that the weighted average offer made by the proposers in the ultimatum game is 41.04%. Among the studied variables, the country where the experiment is run and being an economist have a significant impact on the amounts offered.

Introduction

With a total of more than 2800 citations on Google Scholar (Güth and Kocher, 2013), the ultimatum game of Güth et al. (1982) constitutes the first experience of the most studied game in experimental economics. In the ultimatum game, a sum of money is shared between two players. The first player, called the proposer has to split a sum of money between himself and a second player. The second player, called the recipient, can choose between two actions. He/she may accept the offer of the proposer: in this case the amount of money is shared as the proposer wished. The recipient may also decide to refuse the proposal: in this case both players' earnings are null. Following the prediction of the perfect sub game Nash equilibrium (PSNE), the proposer should offer the smallest positive amount and the recipient should accept this proposition.

Numerous experimental studies on the ultimatum game showed that players adopt a different behavior from the PSNE prediction: the average offer made by the first player is between 40 and 50% of the surplus. On their side, respondents often decline offers below 20% and frequently refuse offers between 20 and 40% of the surplus. Even if these strong deviations observed across the numerous ultimatum game experiments reject the assumptions of selfishness and monetary maximization, they do not question the rationality of economic agents. On the contrary, regularity of these empirical findings highlighted by the ultimatum game enriches the theory by taking into account various factors such as social preferences, emotions, aversions or altruism (Güth and Kocher, 2013). Validation of existing theories or the emergence of new theories can then guide the decision-maker, especially in public policies decisions. Indeed, the detection of stylized facts and strong deviations from the theoretical predictions may lead to reconsider the effects of institutional instruments available to public authorities. The contribution of experimental economics as a tool for decision support has been confirmed many times in the past. For example, the experimental research by Alvin Roth (2002) has been useful to design the auction process to allocate radio frequencies in the United States.

To study the various non-monetary components that guide individual choices, we conducted a statistical analysis of the experimental literature of the ultimatum game on the past three decades. Our article aims firstly to provide an accurate estimate of the average amount offered by the proposer in the ultimatum game, and secondly to identify the determinants of choice of proposers that deviate from the theoretical equilibrium. To meet these objectives, we conducted a meta-analysis and a meta-regression including 97 observations of the simple ultimatum game collected in 41 articles and a book of experimental economics whose references appear at the end of the article.

Meta-analysis is a powerful statistical tool frequently used in the field of medicine since the 1950s[1]. This tool allows the quantitative analysis of aggregated data from different independent studies all focusing on the same variable. In this context, the high statistical power given by the meta-analysis allows to provide very accurate estimates of the effects of different drugs on the treated subjects. While a simple survey of the empirical literature may lead to erroneous intuitions, meta-analysis provides a

[1] More information on the various fields of application of the meta-analysis and its origins are available the following books: Michael Borenstein et al., 2009; Morton Hunt, 1997.

synthetic and quantified reading of the aggregated data whose accuracy cannot be matched by an individual study. This statistical accuracy is naturally increasing with the number of studies included in the analysis and also depends on the selected estimation method. On this last point, our ultimatum game meta-analysis differs from that carried by Oosterbeek et al. (2003). Indeed, in their article, the authors specify that they weren't able to gather the whole data relative to the dispersion of offers for each study. To overcome this shortcoming, we obtained the missing data from the authors. From a methodological point of view, taking into account the dispersion of the effect-size is a fundamental element that allows the statistician to define the appropriate weights of the various studies in the meta-analysis and to obtain a reliable estimate.

Our results show that the player with the initiative in the ultimatum game offers an average 41.01% (standard deviation = 0.5) of the pie. This estimate, far superior to the theoretical equilibrium, is mainly due to the power of refusal of the respondent which forces the proposer to submit a generous offer. A simple comparison between the average offers in the dictator game in which the respondent has no strategic power and the ultimatum game allows to identify this effect (Cooper and Ducther, 2011). However, non-zero offers given by dictators emphasize that altruism also comes into account in the utility function of the players. Many studies of the ultimatum game have attempted to analyze precisely the determinants of choice of proposers through different experimental protocols by modifying three major categories of variables. Firstly, the contextual variables are interested in setting changes simple ultimatum game. The two most important contextual variables are the choice of the amount of money to share as well as the repetition of the game. Demographic variables are then aim to estimate the influence of observable characteristics of the subjects participating in the experiment. Finally, the structural variables aim to analyze the behavior of players in the variants and extensions of the simple ultimatum game. Experiments on contextual variables do not allow to establish a robust causal relationship between these variables and the sum offered by the proposers. Demographic variables have a moderate influence on the proposed sum. Our meta-regression shows that students in economics keep on average 4.9% more of the amount to share than non-economists subjects. Regarding the origins of subjects, players from industrialized countries offer on average 3.35% more of the amount at stake than players from non-industrialized countries. As regards the structural variables, their effect on the choice of players depends on the change in the structure of the ultimatum game. However, our database is exclusively filled with simple ultimatum games[2] and doesn't allow us to analyze the influence of these variables in a meta-regression. Moreover, the analysis of additional variables through our meta-regression such as the average age of the subjects, GDP or HDI of countries where experiments were run has yielded no significant results.

The remainder of this paper is organized as follows: In Section 1, we show how our database was constructed and present all the variables collected. Section 2 presents the main estimation methods used in meta-analysis. In section 3, we present the results of our meta-analysis and meta-regression. Section 4 concludes this section by giving the benefit of our results for further research.

[2] The definition of simple ultimatum game as we hear in our analysis is described in the results section of this article.

1. Data

The database that we have built for this meta-analysis contains a total of 97 observations collected in 41 articles and a book of experimental economics on the ultimatum game. For the sake of representation of the 30 years of experimental research on the ultimatum game we selected a large number of articles whose publication dates range from 1983 to 2012, 2001 being the median date of our sample. As regards the geographical diversity of studies, all of the data on which we work were collected on a set of 29 different countries. The relevance of the results is directly related to the choices made for the construction of the database, which is why we have established certain restrictions on the selected articles that should be comparable. Thus, each observation corresponds to a simple ultimatum game. The "simple ultimatum game "refers to the game in its original form in which a proposer and a recipient play anonymously. Because we want to estimate the average proportion of the amount at stake offered by a proposer, this restriction is to ensure that our results are not altered by the protocol differences of experiences. Thus, we identified all the treatments for these criteria. The average effect (average amount offered) of each ultimatum game treatment we selected corresponds to an observation from our database. For a large number of articles, we selected only one observation: the control treatment.

In the selected studies, proposers and recipients are re-paired each period of play to form new pairs: reputation effects are then excluded ("stranger" protocol). Each experiment provides a minimum of 10 separate actions to proposers: it excludes ultimatum games in which the individual sets of strategies are too small. Furthermore, we chose to retain only the experiments in which subjects negotiate a sum of real money. This basic requirement is to ensure that individuals are subject to monetary incentives whose importance is assumed by economic theory. To obtain a maximum of observations for our database, we mainly used Google Scholar, Jstor, Econlit and ScienceDirect as our research tools. The different combinations of keywords that we used allowed us to see more than 200 experimental articles whose title seemed to have a connection with our study. Naturally, only articles whose characteristics were consistent with our restrictions have been preserved. For each relevant article, we have recorded the following informations: average offer of proposer, standard deviation of offers, the amount of money to share in purchasing power parity, the fact that the subjects are economists or not, the fact that the game is repeated or not, GDP and HDI of the countries where the study is run, the fact that the country is developed or not, the average age of subjects and the fact that it is a game in strategic form or not. These variables are useful to establish any causal links with the offers made by the proposers in a meta-regression.

2. Estimation Methods

The two main estimation models used for a meta-analysis are the fixed effects model and the random effects model. These models called “fixed effects” and “random effects” used in the meta-analysis do not reflect the models of the same name commonly used in the treatment of panel data.

Each of these models presents two different assumptions about effect-sizes across studies[3]. The fixed effects model is based on the assumption that all studies included in the analysis share the same real effect-size represented by a circle in Figure 1[4]. The differences between the several observed effect-sizes, represented by a square in Figure 1 are therefore only due to sampling errors. In contrast, the random effects model is not based on this restrictive assumption and assumes that the real effect-size that we wish to estimate can vary from one study to another. For example, the effect size can vary depending on the subject's age, nationality, experimental parameters or other variables.

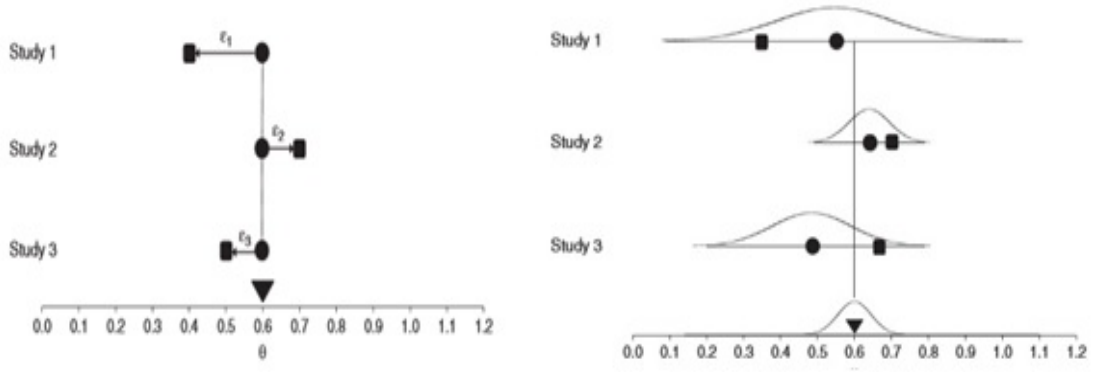

Figure 1: Fixed effects model (left) and random effects model (right)
Source : Introduction to Meta-Analysis (Book), Michael Borenstein et al.

To estimate the average proportion offered by a proposer in the ultimatum game, we prefer to use the random effects model which seems more suited to the ultimatum game due to its non-restrictive design. Indeed, the characteristics of the subjects and the many experimental parameters may cause variations between actual effect-sizes across studies. However, the choice of a random effects model requires a large number of studies to provide an accurate estimate of the effect: the precision of the estimate of the between-study variance (Tau ²) involved in the definition of weights depends on the number of studies included in the sample. In our case, this prerequisite is not a problem: we have 97 observations.

3. Results

A proposer gives on average 41.04% of the amount put into play to its recipient. The high statistical power provided by the aggregation of 97 observations allows us to ensure the accuracy of this estimate: the standard deviation is 0.005 and the 95% confidence interval for the average value of the offer is therefore [40.03%; 42.05%].

[3] In our meta-analysis, the effect-size is the proportion of the amount at stake given by the proposer to the recipient.
[4] The real effect-size can be observed when there is no sampling error, therefore when the size of the sample is infinite.

Number of studies combined	*Effect-size estimate*	*Standard error*	*95% Confidence interval*
97	0.4104	0.005	[0.4003; 0.4205]

Table 1: Meta-analysis : random effects model

Statistics relating to the heterogeneity of our sample of studies presented in Table 2 show that the null hypothesis of the Q test of identical effect-size for all studies is rejected (critical probability = <0.0001).The estimaton of the between-study variance is 0.0022 .

Tau²	*H*	*I²*	*Q test p-value*
0.0022	4	93.7%	0.0001

Table 2: Meta-analysis, heterogeneity statistics

Statistics relating to the heterogeneity of our meta-analysis show a heterogeneous distribution of the effect-size across the different studies of our sample. In our situation, the use of a random effects model is thus preferred. To analyze the origin of the variance across the studies of our sample, we perform a meta-regression on all variables collected in our database. The results of our meta-regression estimated by the random-effects model approach are presented in Table 3.

Variables	*Estimation*	*Ecart-type*	*P-value*
Constant	0.3996	0.0111	<0.0001
Economist	-0.0491	0.0116	<0.0001
Industrialized	0.0335	0.0117	0.0040
Amount at stake (PPP)	0.0000	0.0001	0.4574
Repeated game	-0.0163	0.0110	0.1389

Table 3: Meta-regression, random effects model

Our results on methodological variables show that neither the amount of money involved (1), nor the repetition of the game (2) have a significant influence on the choice of the proposer in the ultimatum game: neither the modest remuneration of players, nor the lack of knowledge of the game are thus able to explain the observed average offers in our sample of 97 observations. These results are consistent with studies by (1) Cameron (1995), Hoffman (1996), Slonim and Roth (1998) and (2) Roth and Erev (1995), Brenner and Vriend (2003), Cooper and Dutcher (2011). On demographic variables, being a student in economics significantly influence (1% level) the amount offered in the ultimatum game: an economist maintains an average 4.91% over the amount to share for himself. This confirms the results of Carter and Irons (1991) according to which the choices of a student in economics are closer to the theoretical equilibrium than the choices of another player in the ultimatum game. As regards the various

countries in which the studies were conducted, the offers made in the experiments carried out in industrialized countries are on average 3.35% higher than offers made in the non-industrialized countries[5]. This result is statistically significant at the 1% level. Studies by Henrich et al. (2005) and Oosterbeek et al. (2004) on the impact of culture in the ultimatum game show a similar trend but fail to identify a statistically significant effect. Less generous offers observed in the poorest countries can be explained mainly by the absence of redistributive system: preferences and expectations of the players are influenced by social institutions and cultural norms of fairness of the environment in which they evolve (Heinrich et al., 2005).

Despite the heterogeneity of the average offers observed, statistical power afforded by the meta-analysis allows us to obtain a robust estimate of the average offer made by the players (SD = 0.005). If it would be wrong to suggest that all players at the individual level exhibit similar behavior in the ultimatum game, it is still possible to conclude that there is a global trend, an implicit consensus that defines the "fair" offer around 40% of the amount to share.

4. Conclusion

Over the past 30 years, the numerous experiments on the ultimatum game and its variations have significantly contributed to the evolution of the theoretical approach to individual behavior. Indeed, the highlighted empirical regularities have participated in the development of relative payoff model of Bolton and Ockenfels (1991), that of Rabin (1993) related to the role of intentions or the model of inequity aversion Fehr and Schmidt (1999). Beyond rationality assumed by standard economic approach, individuals exhibit different concerns that the ultimatum game have partly revealed. If it is not possible to establish a general theoretical model to predict the behavior of all individuals in all types of situations, the disclosure of certain components of the utility function of individuals such as social preferences, different dislikes, altruism or emotions allows microeconomics to better understand the actual behavior of economic agents.

Several extensions of this work can be considered. On the one hand, it would be interesting to analyze the rate of refusal of the various offers in the ultimatum game to calculate the offer that maximizes the proposer's expected payoff. Comparing this to the average offer of 42.3% estimated through our meta-analysis could allow us to determine to what extent proposers of ultimatum game are looking to maximize their payoff. Several works in this direction have already been made: Roth et al. (1991) and Henrich et al. (2001) and Costa-Gomez and Zauner (2002) have attempted to calculate the payoff-maximizing offer but didn't reach the same conclusions. Meta-analysis could then be a suitable tool to improve precision and reach robust conclusions. On the other hand, the comparison of our

[5] The variable "industrialized country" in our study is a dummy variable taking the value "1" when the country in which the study was conducted is an industrialized country and "0" if this is not the case. The various countries in which the experiments were conducted are considered "industrilized" if they meet the following three cumulative criteria: GDP per capita > $ 5,000 (PPP), HDI> 0.6, poverty rate <20%. The qualification of "industrialized country" in our meta-analysis is therefore a subjective criteria that limit the comparability of our results with individual studies on the influence of the level of development of different countries on the choice of the players. Despite this, our results are consistent with studies by Henrich et (2005) al. And Oosterbeek et al. (2004).

results to the average offer in the ultimatum game with the average offer made by a dictator would provide an accurate measure of altruistic and strategic considerations that guide the choices of players in the ultimatum game. For this, the realization of a meta-analysis to estimate the proportion of the sum offered by a dictator seems relevant.

Bibliography

Binmore, K., Shaked, A., Sutton, J., 1985, *Testing Noncooperative Bargaining Theory: A Preliminary Study*, **American Economic Review** 75, 1178-1180

Bolton, G., 1991, *A Comparative Model of Bargaining: Theory and Evidence*, **American Economic Review** 81, 1096-1136

Borenstein, M., Hedges, L., Higgins, J., Rothstein, H., 2009, *Introduction to meta-analysis,* **Wiley**

Bornstein, G., Yaniv, I., 1998, *Individual and Group Behavior in the Ultimatum Game: Are Groups More "Rational" Players ?*, **Experimental Economics** 1, 101-108

Brenner, T., Vriend, N., 2006, *On the behavior of proposers in ultimatum games***, Journal of Economic Behavior & Organization** 61, 617-631

Cameron, L., 1999*, Rasing the stakes in the ultimatum game: experimental evidence from Indonesia*, **Economic Inquiry** 37, 47–59

Carter, J., Irons, M., 1991, *Are Economists Different, and If So, Why?*, **Journal of Economic Perspectives** 5, 171-177

Conrads, J., Irlenbusch, B., 2013, *Strategic ignorance in ultimatum bargaining*, **Journal of Economics Behavior & Organization** 92, 104-115

Cooper, DJ., Dutcher, EG., 2011, *The dynamics of responder behaviour in ultimatum games: a meta-study*, **Experimental Economics** 14, 519-546

Costa-Gomes, M., Zauner, KG., 2001*, Ultimatum Bargaining Behavior in Israel, Japan, Slovenia, and the United States: A Social Utility Analysis*, **Games and Economic Behavior** 34, 238-269

Eckel, CC., Grossman, PJ., 1996, *Alstruism in Anonymous Dictator Games*, **Games and Economic Behaviour** 16, 181-191

Falk, A., Fehr, E., Fischbacher, U., 2008, *Testing theories of fairness: Intentions matter*, **Games and Economic Behavior** 62, 287–303

Fehr, E., Schmidt, K., 1999, *A Theory of Fairness, Competition, and Cooperation*, **Quarterly Journal of Economics** 114, 817-868

Ferey, S., Gabuthy, Y., Jacquemet, N., 2013, *L'apport de l'économie expérimentale dans l'élaboration des politiques publiques*, **Revue Française d'économie** 2013/2, 155-194

Forsythe, R., Horowitz, J., Savin, N.E., Sefton, M., 1994, *Fairness in Simple Bargaining Experiments*, **Games and Economic Behavior** 6, 347–369

Güth, W., Schmittberger, R., Schwarze, B., 1982*, An experimental analysis of ultimatum bargaining*, **Journal of Economic Behavior & Organization** 3, 367–388

Güth, W., Tietz, R., 1988, *Ultimatum Bargaining for a Shrinking Cake - An experimental Analysis -*, **Economics and Mathematic Systems** 314, 111-128

Güth, W., van Damme, E., 1998, *Information, Strategic Behavior, and Fairness in Ultimatum Bargaining: An Experimental Study***, Journal of Mathematical Psychology** 42, 227-247

Güth, W., Kocher, MG., 2013, *More than thirty years of ultimatum bargaining experiments: Motives, variations, and a survey of the recent literature*, **Jena Economics Research Papers** 201-035

Henrich, J., 2000, *Does Culture Matter in Economic Behavior? Ultimatum Game Bargaining among the Machiguenga of the Peruvian Amazon*, **American Economic Review** 90, 973-979

Henrich, J., Boyd, R., Bowles, S., Camerer, C., Fehr, E., Gintis, H., 2005, *Foundations of Human Sociality: Economic Experiments and Ethnographic Evidence from Fifteen Small-Scale Societies*, (book) Published to **Oxford Scholarship**

Hoffman, E., McCabe, K., Smith, V., 1996, *On Expectations and the Monetary Stakes in Ultimatum Games*, **International Journal of Game Theory** 25, 289-301

Hunt, M., 1997, *How science takes stock: the story of meta-analysis,* **Russel sage foundation**

Marwell, G., Ames, RE., 1981, *Economists free ride, does anyone else ?: Experiments on the provision of public goods*, IV, **Journal of Public Economics** 15, 295-310

Mitzkewitz, M., Nagel, R., 1993, *Experimental results on ultimatum game with incomplete information*, **International Journal of Game Theory** 22, 171-198

Ochs, J., Roth, A., 1989, *An Experimental Study of Sequential Bargaining*, **American Economic Review** 79, 355–384

Oosterbeek, H., Sloof, R., Van De Kuilen, G., 2004, *Cultural differences in ultimatum games: Evidence from a meta-analysis*, **Experimental Economics** 7, 171-188

Rabin, M., 1993*, Incorporating Fairness into Game Theory and Economics*, **The American Economic Review** 83, 1281-1302

Roth, A., Prasnikar, V., Okuno-Fujiwara, M., Zamir, S., 1991, *Bargaining and Market Behavior in Jerusalem, Ljubljana, Pittsburgh, and Tokyo: An Experimental Study*, ***The American Economic Review*** 81, 1068-1095

Roth, A., Erev, I., 1995, *Learning in Extensive-Form Games: Experimental Data and Simple Dynamic Models in the Intermediate Term*, **Games and Economic Behavior** 8, 164-212

Slonim, R., Roth, A., 1998, *Learning in High Stakes Ultimatum Games: An Experiment in the Slovak Republic*, **Econometrica** 63, 569–596

Stanley, TD., Tran, U., 1998, *Economics student need not be greedy: Fairness and the ultimatum game*, **The Journal of Socio-Economics** 27, 657-663

Appendix: items constituting the observations of the meta-analysis

Anderson, L., Rodgers, Y., Rodriguez, R., 2000, *Cultural differences in attitudes toward bargaining*, **Economics Letters** 69, 45–54

Andersson, O., Galizzi, M. M., Hoppe, T., Kranz, S., der Wiel, K. V., & Wengström, E.,2010, *Persuasion in experimental ultimatum games,* **Economics Letters** *108*, 16-18.

Bahrya, D., Wilson, R., 2006, *Confusion or fairness in the field ? Rejections in the ultimatum game under the strategy method*, **Journal of Economic Behavior & Organization** 60, 37–54

Boarini, R., Laslier J-F., Robin, S., 2009, *Interpersonal Comparisons of utility in Bargaining: evidence from a transcontinental ultimatum game*, **Theory and Decision** 67, 341-373

Binmore, K., McCarthy, J., Ponti, G., Samuelson, L., Shaked, A., 2002, *A Backward Induction Experiment*, **Journal of Economic Theory** 104, 48–88

Bohnet, I., Zeckhauser, R., 2004, *Social comparisons in ultimatum bargaining*, **The scandinavian Journal of Economics** 106, Behaviorial Economics 495-510

Cameron, L., 1999, *Raising the stakes in the ultimatum game : experimental evidence from Indonesia*, **Economic Inquiry** 37, 47-59

Carter, J., Irons, M., 1991, *Are Economists Different, and If So, Why?*, **The Journal of Economic Perspectives** 5, 171-177

Carter, J., McAloonb, S., 1996, *A test for comparative income effects in an ultimatum bargaining experiment*, **Journal of Economic Behavior & Organization** 31, 369-380

Charness, G., Gneezy, U., 2008, *What's in a name? Anonimity and social distance in dictator and ultimatum game*, **Journal of Economical Behavior & Organization**, 29-35

Chuaha, S-H., Hoffmann, R., Jones, M., Williams, G., 2007, *Do cultures clash? Evidence from cross-national ultimatum game experiments*, **Journal of Economic Behavior & Organization** 64, 35–48

Croson, R., 1996, *Information in ultimatum games: An experimental study,* **Journal of Economic Behavior & Organisation** 30, 197-212

Dickinson, D., 2000, *Ultimatum decision making: a test of reciprocal kindness*, **Theory and Decision** 48, 151–177

Eckel, C., Grossman, P., 2001, *Chivalry and solidarity in ultimatum games*, **Economic Inquiry** 39, 171-188

Ellingsen, T., Johannesson, M., 2005, *Sunk costs and fairness in incomplete information bargaining,* **Games and Economic Behavior** *50*, 155-177.

Ensminger, J., 2004, *Market integration and fairness: evidence from ultimatum, dictator, and public goods experiments in East Africa,* ***Foundations*** **of human sociality: Economic experiments and ethnographic evidence from fifteen small-scale societies**, 356-381.

Fershtman, C., Gneezy, U., 2001, *Strategic Delegation: An Experiment*, **The rand Journal of Economics** 32, 352-368

Gil-White, F. J., 2004, *Ultimatum game with an ethnicity manipulation,* **Foundations of human sociality: Economic experiments and ethnographic evidence from fifteen small-scale societies**, 260-304

Güth, W., Schmittberger, R., Schwarze, B., 1982*, An experimental analysis of ultimatum bargaining*, **Journal of Economic Behavior & Organization** 3, 367–388

Heinrich, J., 2000, *Does culture matter in economic behavior? Ultimatum game Bargaining among the machiguenga of the Peruvian Amazon*, **The American Economic Review** 90, 973-979

Henrich, J., Boyd, R., Bowles, S., Camerer, C., Fehr, E., Gintis, H., 2005, *Foundations of Human Sociality: Economic Experiments and Ethnographic Evidence from Fifteen Small-Scale Societies*, **Published to Oxford Scholarship**

Hennig-Schmidta, H., Lib, Z-Y., Yang, C., 2008, *Why people reject advantageous offers: Non-monotonic strategies in ultimatum bargaining evaluating a video experiment run in PR China*, **Journal of Economic Behavior & Organization** 65, 373–384

Hoffman, E., McCabe, K., Shachat, K., Smith, V., 1994, *Preferences, Property Rights, and Anonymity in Bargaining Games*, **Games and economic behavior** 7, 346-380

Hoffman, E., McCabe, K., Smith, V., 1996, *On Expectations and the Monetary Stakes in Ultimatum Games*, **International Journal of Game Theory** 25, 289-301

Hoffman, E., McCabe, K., Smith, V., 2000, *The Impact of Exchange Context on the Activation of Equity in Ultimatum Games*, **Experimental Economics** 3, 5–9

Hoffmann, R., Tee, J-Y., 2006, *Adolescent-adult interactions and culture in the ultimatum game*, **Journal of Economic Psychology** 27, 98-116

Macfarlan, S., Quinlan Kinship, R., 2008, *Family and Gender Effects in the Ultimatum Game,* **Human Nature** 19, 294–309

Murnighan, J. K., Saxon, M. S., 1998, *Ultimatum bargaining by children and adults*, **Journal of Economic Psychology** 19, 415-445

Okada, A., & Riedl, A., 1999, *When culture does not matter: Experimental evidence from coalition formation ultimatum games in Austria and Japan,* Tinbergen Institute Discussion Paper

Oxoby, R., McLeish, K., 2004, *Sequential decision and strategy vector methods in ultimatum bargaining: evidence on the strength of other-regarding behaviour*, **Economics Letters** 84, 399–405

Rapoport, A., Sundali, J., 1996, *Ultimatums in two-person bargaining with one-sided uncertainty: Offer games international*, **Journal of Game Theory** 25, 475-494

Roth, A., Prasnikar, V., Okuno-Fujiwara, M., Zamir, S., 1991, *Bargaining and Market Behavior in Jerusalem, Ljubljana, Pittsburgh, and Tokyo: An Experimental Study*, ***The American Economic Review*** 81, 1068-1095

Slonim, R., Roth, A., 1998, *Learning in High Stakes Ultimatum Games: An Experiment in the Slovak Republic*, **Econometrica** 63, 569–596

Solnick, SJ., 2001, *Gender differences in the ultimatum game*, **Economic Inquiry** 39, 189-200
Suleiman, R., 1996, *Expectations and fairness in a modified ultimatum game*, **Journal of Economical Psychology** 17, 531-554

Tracer, D., 2004 *Market integration, reciprocity and fairness in rural papua new guinea: Results from a two-village ultimatum game study,* **The Field Experiments Website**

Xiao, E., Houser, D., 2005, *Emotion expression in human punishment behaviour*, **Proceedings of the National Academy of Sciences** 102, 7398–7401

Zaatari, D., Trivers, R., 2007, *Fluctuating asymmetry and behavior in the ultimatum game in Jamaïca*, **Evolution and Human Behavior** 28, 223-227